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## NEW SPECIES OF OLIARUS STÅL FROM SOUTHWESTERN UNITED STATES AND MEXICO

(Homoptera: Cixiidae)

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The following is a report on two small collections of cixiids; one received from the California Academy of Sciences through the courtesy of Dr. Edward S. Ross, the other from the Ohio State University through the courtesy of Prof. Josef N. Knull. The letters CAS after type designation signify that the types are deposited in the California Academy collection at San Francisco, California; OSU denotes that the types concerned are deposited in the Ohio State collection at Columbus, Ohio.

### *Oliarus eximus* Caldwell, new species

Length, male 6 mm.; female 6.3 mm. Black with carinae faint orange in male, deep orange in female. Elytra and main veins white in male with the following markings black; all punctations, junction of cubital veins with commissural margin, all cross veins, stigma, radius and cross strut to media including furcation of media and termination of all veins. Elytra in female with dark markings of male broadened often forming irregular dashes apically.

Frons deeply inserted into clypeus. Vertex of broad type, broader in female than in male; lateral margins parallel in basal half, convergent apically. Intermediate carinae of pronotum not reaching posterior margin. Mesonotum with median tablet very broad; lateral carinae as well as intermediate carinae slightly curved.

Male pygofer with lateral margins produced extremely far caudad; medioventral process greatly enlarged, rounded in outline. Forceps very long, curved around medioventral process of pygofer; broadened apically with inner and outer angles equally produced in ventral aspect. Anal segment long, somewhat flattened apically.

Aedeagus of reduced type as found in the placitus group; perianthrium with three long and one short basal process.

Male holotype from SANTA ROSA MTS., CALIFORNIA, June 15, 1946; female allotype same locality, May 27, 1946; paratypes May 27, 1946, June 15, 1946, June 25, 1946 (D. J. & J. N. Knull), OSU.

Resembling *placitus* Van D. but differing by the lack of bifurcate processes on the periandrium and other phallic characters as noted in the description.

*Oliarus eximus teximus* Caldwell, new subspecies

Length, male 5.3 mm.; female 7.3 mm. Dark brown with lighter carinae. Elytra milky with brown veins in male. Elytra in female with a tendency for fuscous color to spread over the entire surface.

Male pygofer not produced as far caudad as in typical form; medioventral process proportionately larger. Forceps with inner apical angles produced more than outer. Anal segment hood-like, not flattened apically. Periandrium with all basal processes about equal length or with medioventral process a little longer than others.

Male holotype from BASTROP N. P., TEXAS, May 1, 1941; female allotype and male paratype, Uvalde County, Texas, May 3, 1941; female paratypes, Uvalde County, May 11, 1946, and Brownsville, Texas, May 8, 1935 (D. J. & J. N. Knull), OSU.

Lighter colored than typical form with more markings on female; slightly different phallic characters in male as noted in the description.

*Oliarus forcipatus* Caldwell, new species

Length, male 5 mm.; female 5.5 mm. General color black with all carinae light brown to deep yellow. Mesonotum with area between lateral and intermediate carinae deep yellow; lateroposterior margins edged in yellow. Elytra whitish hyaline; veins light brown, darkening apically.

Vertex elongate; lateral margins greatly elevated; facets almost half as long as vertex. Intermediate carinae of pronotum reaching posterior margin. Intermediate carinae of mesonotum close to lateral carinae, especially basally.

Male pygofer with lateral margins greatly produced caudad, acute; medioventral process short, stout. Forceps long, broadened and recurved apically. Anal segment elongate, hood-like. Aedeagus with two apical processes, caliper-like. Periandrium with left ventral process very broad, trifid apically; right ventral process slender, straight; a slender, straight process present dorsally.

Male holotype and paratypes, July 23, 1946; female allotype and paratypes, June 2, 1937, from DAVIS MTS., TEXAS (D. J. & J. N. Knull), OSU.

Differing from other oliarids by the phallic characters as noted in the description.

*Oliarus abacus* Caldwell, new species

Length, male 7 mm.; female 7.6 mm. General color light fuscous with all carinae and median tablet of mesonotum light brown. Veins light brown with dark brown punctations. Female with most cross veins and furcation of main veins broadly blackened, giving a mottled appearance.

Vertex longer than broad, broadly trough-like; facets short, triangular. Intermediate carinae of pronotum far from posterior margin. Carinae of mesonotum prominent; intermediate carinae evenly arcuate, slightly nearer lateral carinae than median. Posttibiae each with one or two spurs well basad. Punctations on veins very small.

Male pygofer with lateral margins produced well caudad on either side; medioventral process elongate, roughened apically. Forceps not greatly broadened apically (left and right of different shape in type); inner teeth very elongate. Anal segment asymmetrical apically; left apex produced ventrad. Aedeagus with very elongate subapical process; right basal portion of periandrium with slender elongate process. Anal segment of female broadly elliptical with either end truncate.

Male holotype, female allotype, and thirteen paratypes from "REAL DE ARRIBA, TEMASCALTEPEC, MEXICO," May 22, 1933 (Hinton & Usinger), CAS.

*Abacus* resembles any other medium sized oliarid but differs by the phallic structure as noted in the description.

*Oliarus catus* Caldwell, new species

Length, male 5.6 mm.; female 5.9 mm. Black over all with red carinae. Elytra whitish hyaline with brown veins.

Vertex short, broad, more apparent in female because the lateral margins are less elevated. Frons much widened apically, concave on either side of prominent median carina; clypeus strongly convex. Intermediate carinae of pronotum not reaching posterior margin. Lateral and intermediate carinae of mesonotum slightly arcuate, not prominent. Posttibiae each with one large spur and several small basal spurs.

Male pygofer with lateral margins acutely produced caudad on either side; medioventral process short, thick. Forceps elongate, broadened and recurved apically. Anal segment hood-like. Aedeagus without direct apical processes; periandrium produced into a very large lobe on either side ventrally; lobes acute apically, divergent.

Male holotype "CARR CYN. ARIZONA, HUACHUCA MTS.," June 23, 1932. Female allotype "Cave Crk. Arizona, Chiricahua Mts.," June 20, 1932 (J. O. Martin), CAS.

Differing from other oliarids by the phallic structure as noted in the description.

*Oliarus retentus* Caldwell, new species

Length, male 4.5 mm.; female 5.4 mm. General color black. Median facial carina and mesonotal carinae red in male. Intermediate carinae of mesonotum and space between intermediate and lateral carinae yellowish in female. Elytra whitish hyaline with yellow veins; apical cross veins broadly fuscous; punctations brown; stigma lightly embrowned.

Vertex elongate, narrow, acute apically. Basal fork of median facial carinae almost obsolete. Intermediate carinae of pronotum not reaching posterior margin though appearing to because of color. Intermediate carinae of mesonotum almost obsolete. Posttibiae with three preapical spurs diminishing in size toward base of tibia.

Male pygofer with lateral margins angularly produced caudad on either side; medioventral process short, triangular. Forceps long, slightly enlarged apically; apices recurved. Anal segment flap-like. Aedeagus with two apical and one subapical processes; periandrium with one long, straight process at right base and two curved processes at left apex.

Anal segment of female small, ovate, broader than long.

Male holotype, female allotype, and 11 paratypes from NOGALES, ARIZONA, September, 1906, (Koebele), CAS.

Differing from other oliarids by phallic details as noted in the description.

*Oliarus rarus* Caldwell, new species

Length, male 5.7 mm. Fuscous with exception of brown face, yellowish legs, orangish mesonotal tablet, and light carinae. Elytra whitish hyaline with yellowish veins punctate with black.

Vertex elongate; median carina present for three-fourths length; apical facets short. Intermediate carinae of pronotum not reaching posterior margin. Intermediate carinae of mesonotum strongly arcuate. Posttibiae each with one large and one medium preapical spur. Furcation of Sc and R at about center of elytron.

Male pygofer with lateral margins broadly produced caudad on either side; medioventral process elongate, broadly rounded apically, keeled ventrally. Forceps broadly spatulate apically; inner tooth highly developed and bifid on right forcep, small and single on left. Anal segment broad, flap-like. Aedeagus with one apical and two subapical processes; periandrium with long basal process on right projecting to left and a subapical process projecting straight caudad, a small subapical spur present dorsad projecting cephalad.



Male holotype from CERALBO ISLAND, GULF OF CALIFORNIA, June 8, 1921 (Chamberlin), CAS.

Differing from other oliarids by phallic characters as noted in the description.

*Oliarus isolatus* Caldwell, new species

Length, male 5 mm. Brownish fuscous with all cranial carinae and pronotal carinae light yellow; apex of mesonotum yellowish. Veins yellow becoming fuscous apically; punctations black, prominent; few light fuscous spots scattered over elytra.

Vertex narrow for full length, rounded rather than acute apically; lateral margins almost perpendicular. Intermediate carinae of mesonotum obsolete, median carina very fine. Fork of Sc and R in basal half of elytra.

Male pygofer with lateral margins greatly produced caudad on either side; medioventral process hemispherical, tipped with a small acute spur. Forceps short, stout, recurved apically. Anal segment hood-like. Aedeagus with one long apical process and two small subapical processes (one dorsal and one ventral). Periandrium with two large basal processes and two slender apical processes; no dorsal process present at apex.

Male holotype, from MARIA MADRE VILLAGE, TRES MARIAS ISLANDS, MEXICO, May 21, 1925 (Keifer), CAS.

Differing from most oliarids by the obsolete intermediate mesonotal carinae and from all others by the phallic characters as noted in the description.

*Oliarus nanus* Caldwell, new species

Length, male 4.5 mm. Black with cranial and pronotal carinae reddish-orange. Elytra slightly yellowed at base; veins brownish-yellow; punctations concolorous with veins.

Vertex very narrow, deep; facets very elongate. Frons elevated along median carina; clypeus flatter. Intermediate carinae of pronotum reaching posterior margin. Mesonotal carinae very fine. Posttibiae with one large preapical spur. Sc and R very long.

Male pygofer with opening flared; lateral margins notched on either side caudad; medioventral process short, stout. Forceps short, stout, recurved laterally and cephalad at apices in ventral aspect; with dorsal thumb-like projection in lateral aspect. Anal segment invert cup-shaped apically, apex split. Aedeagus with one long apical process at left; periandrium with one large bifurcate apical process at left, right base broadly lobate.

Male holotype from "REAL DE ARRIBA, TEMASCALTEPEC, MEXICO," May 23, 1933. Paratype (with tip of abdomen missing) same locality, May 21, 1933 (Hinton & Usinger), CAS.

Resembling *isolatus* but differing by the presence of intermediate mesonotal carinae and by phallic characters as noted in the description.

*Oliarus aztecus* Caldwell, new species

Length, male 5.8 mm.; female 6 mm. Black over all with dark orange carinae. Legs yellowish. Veins yellowish becoming fuscous apically, punctations scarcely embrowned.

Vertex narrow, trough-like, more acute in female than male. Face narrow, median carinae very prominent. Intermediate carinae of pronotum almost reaching posterior margin. Intermediate carinae of mesonotum little elevated, slightly nearer lateral carinae than to median. Posttibiae each with two large and several small preapical spurs, the latter near the base. Elytra narrow, elongate; punctations scarcely visible.

Male pygofer with lateral margins truncate caudad; medioventral process elongate. Forceps very elongated, greatly broadened apically, recurved; inner teeth elongate. Anal segment flap-like, straight, bifid apically. Aedeagus with three long and one short apical processes, a short process present at base of apical portion; periandrium with bifurcae apical process.

Male holotype, female allotype, and three paratypes from "TEJUPILCO, TEMASCALTEPEC, MEXICO," June 17, 1933 (Hinton & Usinger), CAS.

Differing from other oliarids by the phallic characters as noted in the description.

*Oliarus bispinus* Caldwell, new species

Length, male 4.4 mm. General appearance black; median frontal carina faintly orange; spots on vertex next to either eye white; pronotal carinae gray; tibiae and tarsi dusky yellow; elytra milky colored; veins brownish-yellow becoming fuscous apically.

Face greatly curved in profile. Vertex elongate; impressed on either side of short, basal, median carina. Intermediate carinae of pronotum not reaching posterior margin. Lateral and intermediate carinae of mesonotum very thin. Punctations on veins few, regular.

Male pygofer with lateral margins produced caudad, acute; medioventral process short, ovate. Forceps long, recurved, little expanded apically. Anal segment short, hood-like. Aedeagus without apical processes; periandrium with bifurcate process at dorsal apex in addition to three ventral processes.

Male holotype from CHISOS Mts., TEXAS, July 17, 1946 (D. J. & J. N. Knull), OSU.

*Bispinus* differs from the other oliarids by the bifurcate process on the dorsal surface of the periandrium in addition to other phallic characters as noted in the description.

*Oliarus uncatus* Caldwell, new species

Length, male 4.8 mm. Face light brown with yellowish carinae. Vertex and mesonotum black. Carinae of mesonotum orange; area between outer and intermediate carinae orange. Elytra milky with yellow veins becoming darkened apically.

Face evenly ovate; median carina prominent. Vertex narrow, trough-like. Intermediate carinae of mesonotum broken, irregular. Punctations on veins regular, not prominent; stigma long, narrow.

Male pygofer with lateral margins acute caudad; medioventral process long, slender. Forceps spatulate apically, slightly recurved, appearing coiled. Anal segment relatively short, hood-like. Aedeagus with one apical and one subapical process; periandrium with short spur dorsally; with three processes ventrally, left process broad and slightly bifid apically.

Male holotype from PRESCOTT N. F., ARIZONA, June 20, 1947 (D. J. & J. N. Knull), OSU.

Differing from other oliarids by the phallic characters as noted in the description.

*Oliarus sylvaticus* Caldwell, new species

Length, male 3.5 mm.; female 4 mm. General color black; all carinae brownish-yellow. Elytra whitish hyaline; veins black except costa; cross veins broadly fuscous; stigma in male yellow, black in female.

Face angulate in profile, strongly convex. Vertex about twice as long as broad, lateral margins parallel in basal two-thirds. Intermediate carinae of pronotum not reaching posterior margin. Median tablet of mesonotum broad, carinae equidistant apart. Punctations on veins close, evenly spaced, not prominent.

Male pygofer with lateral margins broadly rounded caudad; medioventral process short, acute. Forceps spatulate apically; apices appearing rectangular in ventral aspect. Anal segment flap-like. Aedeagus with three apical processes; periandrium produced into large plate-like process on left, right process thin; a long spine-like process present near dorsal apex.

Female valvulae very short, flat; anal segment small, rounded.

Male holotype and paratype, and female allotype from OAK GROVE, CALIFORNIA, June 3, 1946 (D. J. & J. N. Knull), OSU.

Differing from other oliarids by the phallic characters as noted in the description.